



## Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).

be characterized, each in its own System, by the Uniqueness and Peculiarity which characterize our Sun in its System" \*.

No suggestion is offered in this paper as to the remote origin of the solar elements, or that of the force by which they are conceived to be condensed into ponderable matter.

## II. "On Zoological Names of Characteristic Parts and Homological Interpretations of their Modifications and Beginnings, especially in reference to Connecting Fibres of the Brain." By Prof. OWEN, F.R.S. Received March 10, 1865.

In a paper "On the Commissures of the Cerebral Hemispheres of the Marsupialia," &c., of which an 'Abstract' appears in the last published Part of the Proceedings of the Royal Society (No. 72), the author quotes the definitions of those structures given as zoological characters by me in a brief summary of the primary divisions of the class *Mammalia*, communicated to the Linnean Society in 1857.

The remarks on the signification and homology of those structures in my anatomical publications are not given, I am consequently misrepresented. Errors are imputed to me which the author deems it important to rectify before the Royal Society; and as the Proceedings of the Society will carry this imputation far and wide through the world of science, I venture to hope that the present defence will not be deemed uncalled for, but may be permitted to have place in the Serial which has diffused the attack.

In this I am moved, less on personal grounds, than in the interest of science and of scientific ethics; for of late a practice has arisen of representing a zoological definition of a part which an anatomist may have given in a classificatory work, as the exponent of his homological knowledge and descriptions of such part, in its various modifications and grades of development. Cuvier, for example, in his characters of the order *Bimana*, affirms that Man is the only animal possessing 'hands' and 'feet':—"L'homme est le seul animal vraiment *bimane* et *bipède*" †.

The *Quadrumana* are differentiated as having 'hands' instead of 'feet,' a 'hand' being defined as having the thumb opposable:—"Le pouce libre et opposable aux autres doigts, qui sont longs et flexibles" ‡.

The aim of the author in the zoological work above cited was to impart obvious and easily apprehended differential characters of the organ which observation had shown to define the groups.

The naturalist, thus enabled to place his subject in its proper class or order, is not concerned, as such, in knowing the homological or transcendental relations of the part or character which has afforded him the means of effecting what he wished to do.

\* Syllabus of Lectures on Astronomical Physics, Lect. VII.

† Règne Animal, tom. i. p. 70, 1829.

‡ Ibid. p. 85.

Linnæus, to whom mainly is due the discernment of the powerful instrument of well-defined terms in acquiring a systematic Science of Nature, and to whom we owe our best knowledge of its use, so named the guiding parts of plants and animals, for such arbitrary or special application, in Botany and Zoology: for example, the 'bract,' the 'spath,' the 'sepal,' the 'petal,' are differentiated from the 'leaf,' as things distinct.

What would be thought of the botanical critic who, quoting the definition of the flowers of Cyperaceous plants, as consisting, for example, of 'glumes,' should meet the statement by a flat contradiction, as, viz., that they were nothing but little bracts,' and who, then, with a show of profounder research should proceed to expound the 'bract' as being the first step by which the common leaf is changed into a floral organ? The answer is obvious. But what next might be said, if it were pointed out that the objector had obtained this very notion from the 'Prolepsis Plantarum,' or other homological writings of the author criticised, where such philosophical considerations, foreign to the classificatory work, were the proper aim and object? So, with regard to the zoological definitions and characters of Cuvier. Those which I have cited might be met by as flat contradictions: such as that, "The 'hind hands' of the *Quadrumana* are nothing but 'feet'"; and the contradictor might then proceed to demonstrate, with much show of original research, the homology of the 'astragalus,' 'calcaneum,' 'cuboides,' 'cuneiform bones,' &c., in order to establish his discovery that a hand and foot are all one.

It is true that if the homological descriptions in the '*Léçons d'Anatomie Comparée*' had been quoted as well as the zoological definitions from the '*Règne Animal*,' the immortal author of the latter work would be shown to have had previous possession of the homological knowledge. Nay more, in the "Cinquième Leçon, Articles VII.-IX. 'Des os du pied'""\*, the frame of the hind feet of Man, Ape, Lion, Seal, Elephant, &c. is shown to consist of homologous bones. Nevertheless the great Zootomist, in his labour and character as Zoologist, does not hesitate to define and differentiate the 'foot,' the 'hand,' the 'paw,' the 'fin,' and the 'hoof,' respectively: nor does he deem the demonstration of the unity underlying the diversity to make the 'man' an 'elephant' or a 'seal,' any more than it makes him a 'dog' or an 'ape'!

It is time that the procedure be exposed and stigmatized which consists in representing the homological knowledge and opinions of the author by his definitions in a purely zoological work, and in suppressing all reference to the descriptions and statements in the anatomical writings of the same author, where his actual knowledge and opinions on the nature and homology of parts are given, and where alone they can be expected to be found.

My present remarks refer to the published 'Abstract' of Mr. Flower's paper. What justice he may have done me by other references in the paper itself, I know not, nor does it concern me since the distribution of

\* *Léçons d'Anat. Comp.*, tom. i. 1805.

Part No. 72 of the Proceedings of the Royal Society. In this 'Abstract' I find that, to previous knowledge, and especially my own as represented by the citation of a cerebral character from my Zoological Essay, given at p. 71, Mr. Flower proposes to add, as discoveries of his own, and by way of correction of alleged errors of mine, that the corpus callosum does exist in the Marsupialia and Monotremata; that the transverse fibres connecting the hippocampi are not parts of the fornix, "which is essentially a longitudinal commissure"; that the "two halves of the cerebrum are not by any means disconnected, as the term 'Lyencephala' would imply, but that they are united in a remarkable manner by the immense size of the anterior commissure" (p. 73).

After these pretensions, put forward by a Fellow of the Royal Society in opposition and assumed superiority to a previous labourer in the field, it would naturally be taken for granted that the statements and opinions of the author assailed had been fairly and fully quoted. It might be long before any one would deem it necessary to test the grounds of dispute by reference to Prof. Owen's anatomical writings on the subject. I therefore beg to leave to quote from those writings the following passages.

With regard to the Marsupialia, I state, "This commissure [viz. the commissure of the hippocampi] may nevertheless be regarded as representing, besides the fornix, the rudimental commencement of the corpus callosum." (Phil. Trans. 1837, p. 91.)

In a subsequent anatomical Monograph I wrote, in 1840, "The essential function of the fornix, as a longitudinal commissure, uniting the hippocampus major with the olfactory lobe of the same hemisphere, is more exclusively maintained in the Ornithorhynchus, in consequence of the smaller size of the transverse band of fibres uniting the opposite hippocampi, and representing the first rudiment of the corpus callosum, as it appears in the development of the placental embryo." Art. *Monotremata*, Cycl. of Anat. and Physiol., vol. iii. p. 383, 1841.)

In reference to other connexions of the opposite hemispheres I state, "The anterior commissure is very large in the Monotremes, as in the Marsupials" (*ib.* p. 383); and that "it is the principal commissure of the hemispheres, is subcylindrical, and measured, in the brain of a Platypus, two lines thick vertically, and one and a half lines horizontally" (*ib.* p. 385).

With regard to the inner wall of the cerebral hemisphere, I describe "the fissure upon which the hippocampus is folded" in the Marsupial brain. (Phil. Trans. 1837, p. 90.)

I regret to be compelled to show by the foregoing quotations the sources whence Mr. Flower has derived, or might have derived, the ideas that the essential nature of the fornix, as contradistinguished from its anthropotomical definition, is that "of a longitudinal commissure," that the transverse fibres which connect together the two hippocampi, and form part of the wall of the lateral ventricle, may be regarded as the homologue of part, at least, of the corpus callosum, and that the absence of the main

part of the great commissure of Placentalia is compensated in the Implacentalia by the presence of a large "anterior commissure."

Having no one's shortcomings to exaggerate, I did not, indeed, in the above cited works attribute to this commissure an "immense" size \*, but preferred, finding it measurable, to give its dimensions, in the *Ornithorhynchus*, *e. g.*, and to show, as in fig. 1, *g*, Plate VII. *Phil. Trans.* 1857, its large proportional size in the Opossum's brain.

I nowhere assert that the mesial wall of the lateral ventricle ('septum ventriculorum' of Mr. Flower) is disconnected with what I affirm to be the beginning of the corpus callosum; on the contrary, both in my original paper in *Phil. Trans.* 1837, and in the art. *Marsupialia*, I describe that wall or 'septum' to be in part composed by or continued from the superior and internal border of the hippocampal fibres, "forming, in the Wombat, a thin lamina analogous † to the septum lucidum," and, "in the Kangaroo, a stronger and thicker one."

So far as I can comprehend Mr. Flower's account of "the upper and anterior part of the transverse band which passes between the hemispheres of the marsupial brain and radiates out in a delicate lamina above the anterior part of the lateral ventricle," he and I are recording observations of similar facts. Only, inasmuch as the fibres which radiate from the hippocampal commissure to form a delicate lamina above the anterior part of the lateral ventricle, contribute, according to my observations, to constitute part of the wall of such ventricle, and, indeed, a greater proportion thereof than its mere anterior part, I should not describe them as being, or as passing, "between the hemispheres."

The question that remains is the one of interpretation, whether, viz., in reference to the placental condition of the great transverse commissure, and to its relation to the "septum ventriculorum," any portion of the fibres from the hippocampal commissure cross from hemisphere to hemisphere above that septum, after the manner of a 'corpus callosum'?

It is of course open to any anatomist to limit the definition of the fornix, as suggested in my description of the brain of the *Ornithorhynchus*, to the longitudinal commissural fibres of the hemispheres, and to expand the definition of the 'corpus callosum' to the transverse commissural fibres of the same hemispheres.

Accordingly, when Mr. Flower asks, "granted that only the psalterial fibres are represented in the upper commissure of the Marsupial brain, why should the name of 'corpus callosum' be refused to it?" (p. 73), having shown that no such refusal can be imputed to me, I reply by another question—"Granted that the chief inter-hemispherical connecting fibres in

\* "The two halves of the cerebrum are by no means 'disconnected,' the want of the upper fibres is compensated for in a remarkable manner by the immense size of the anterior commissure." (Flower, *loc. cit.* p. 73.)

† At that date (1836) the terms 'analogous' and 'homologous' had not settled significations.

Marsupial brains are homologous with the 'anterior commissure,' why should the name of 'corpus callosum' be refused to them?"

"These fibres [as Mr. Flower repeats after me] are part of the great system of transverse fibres bringing the two hemispheres into connexion with each other," &c. \*

But however germane such speculations may be to Philosophical Anatomy, they are altogether out of place in plain zoological definitions. In these, to be of use or to be understood, we must adopt Linnæan sharply-defined terms, such as 'bract,' 'spath,' 'sepal,' 'petal,' 'paw,' 'foot,' 'fin,' 'hand.' If the zoologist believes that he has found characters in the brain leading to an improved classification of a group, he must enunciate those characters in terms by which they will be understood, agreeably with the current and accepted anatomical definitions of the part. It may be long ere either my homological notices or my successors' lead Anthropotomists to dissociate the 'psalterial fibres' or 'transverse commissure of the hippocampi' from the rest of their complex idea of a 'fornix,' or compel them to change the definition of that part of the brain.

No amount of subtle suggestions of signification of delicate radiations of fibres or laminæ will make the 'hippocampal commissure' of the Wombat equivalent to the 'corpus callosum' of the Beaver, in the eye of the naturalist: if the essential element of his idea of a 'corpus callosum' be a mass of transverse fibres crossing the hemispheric fissure, and he does not find them there on divaricating the hemispheres, he will not see them elsewhere at anybody's bidding.

If a group of mammals want such commissural fibres, and another group possess them, the classifier will avail himself of a well-defined term expressing such difference, without prejudice to his reception of any homological determination of the parts, or their rudiments, in anatomical works of the applier of the term.

Finally, I submit the following contrast. Mr. Flower represents the sum of "the literature of the subject" of his paper (p. 71) as "a statement by Professor Owen (Phil. Trans. 1837) of the absence in the Marsupials of the 'corpus callosum,'" and he opposes to that statement "the result of his present investigation" (*ib.*). MM. F. Cuvier and Laurillard, in their description of the marsupial brain, in the posthumous edition of the '*Leçons d'Anatomie Comparée*,' sum up my contribution to the literature of the subject as follows:—"L'observation de M. Owen sur cette disposition du cerveau des marsupiaux a été repoussée à tort comme erronée. Il ne nie pas l'existence du 'corps calleux' dans les marsupiaux, comme on l'a supposé; il déclare formellement qu'on peut voir, si on le veut, dans ce qui reste de la commissure, le rudiment d'un 'corps calleux'; mais il relève avec raison l'absence dans les marsupiaux d'un 'corps calleux' comparable à celui des autres mammifères."—Vol. iii. p. 101, 8vo, 1845.

\* Proc. Roy. Soc. vol. xiv. p. 73.